AOIT Computer Networking

Lesson 9

Implementing and Troubleshooting a Peer-to-Peer Network

Student Resources

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Student Resource 9.1

Minor Project Launch: How-to Guide

Student Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

The Scenario

Imagine that an old friend of yours from junior high just called you to get back in touch. He’s just moved back to town and is excited to reconnect with old friends. Before he can hang out with you, though, his family wants him to finish the project of setting up their home computer network.

Can you help him answer the following question?

*“How can my family and friends share files such as pictures, music, and movies on different computers in the same house, without using the Internet?”*

Would you be able to help your friend answer the question, and send him some instructions about how to set up a simple network?

Analyzing the Steps for Your How-to Guide

As you complete the activities in this lesson, you will learn all the steps you need in order to write an instructional guide that will help your friend set up his network.

Before you get started, do a preliminary analysis to figure out what steps you’ll need to take and what you still need to learn before you can help your friend. Answer the following questions to get started with your brainstorming:

* Which operating system is installed on your friend’s computers?
* What steps will my friend need to take to get computers in the same house to communicate?



* What do I need to learn to complete the list of steps or to explain how to complete each step?
* What do I need to learn about instructional guides in order to write the how-to guide?

Student Resource 9.2

Worksheet: Analyzing How-to Guides

Student Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date:\_\_\_\_\_\_\_\_\_\_\_\_

Directions: Before you get started writing the how-to guide for your friend, review the rubric that your teacher gives you to make sure you understand how to create a how-to guide that exceeds expectations. Next, read some examples of how-to articles, and take notes in the table below about what you think works in the examples. How do the writers use the language and the layout of the articles to make the directions easy to follow? Record the titles of the articles you read, and then take notes about the language used in the articles (such as the voice and tone, or types of words used) and the formatting elements (layout).

These two websites have some examples to get you started: <http://www.ehow.com> and <http://www.wikihow.com>.

What Are the Effective Elements of a How-to Guide?

How-to guides are articles, brochures, or other documents whose purpose is to help people learn to do things on their own, outside the classroom. They are often published in magazines, in newspapers, or online. In the publishing industry, they are considered “evergreen” articles because they do not become outdated in the same way news and current events articles do.

Analysis of How-to Guide Examples

|  |  |  |
| --- | --- | --- |
| **Article’s Title** | **Language** | **Layout** |
| *Example: How to Program a Cell Phone* | *Uses clear commands and directives* | *Uses numbered lists that separate each step of the process* |

Structuring Your How-to Guide

Your how-to guide to help your friend set up his network should be at least a page long. The guide should:

* Use elements of effective how-to guides that you discover in your research.
* Employ visual tools such as lists and columns to make it easy to read.
* Contain illustrations such as diagrams, screenshots, or photographs to show the process.
* Explain each step clearly and in detail so that even someone with little previous technical background could perform the tasks.
* Be complete and accurate, with all essential steps included.
* Be written in an imperative voice, giving directions and commands.
* Use correct grammar and spelling to communicate clearly.

Student Resource 9.3

K-W-L Chart: IP Address Classes

Student Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date:\_\_\_\_\_\_\_\_\_\_\_

Directions: In the first column, fill in what you already know about IP addresses. In the second column, fill in what else you want to learn about them in order to construct a network. Then fill in the “What I Learned”  
column as you read Student Resource 9.4, Reading: IP Address Classes.

| What I Know | What I Want to Know | What I Learned |
| --- | --- | --- |
|  |  |  |

Student Resource 9.4

Reading: IP Address Classes

An IP (Internet Protocol) address is a set of numbers used to uniquely identify a device on an IP network. The address is made up of 32 binary bits (1 or 0). Rather than showing the IP address as a 32-bit binary, it’s easier to use a format called *dotted decimal*. The 32 binary bits are broken into four octets (1 octet = 8 bits). Each octet is converted to decimal and separated by a period (dot). The value in each octet ranges from 0 to 255 decimal, or from 00000000 to 11111111 binary.

Take a good look at this IP address: 140.179.220.200

You will see that it has four sections, each with one to three digits in decimal notation. Each of the four sections represents 8 bits, or 8 binary numbers:

140 .179 .220 .200

10001100.10110011.11011100.11001000

Each IP address has two parts: the first identifies the network and the subnet, and the second identifies the node (router or computer). IP addresses are categorized into classes based on which numbers identify the network and which refer to the node.

Each class of address can accommodate a different number of nodes. Class A is used for very large networks with a large number of network devices, such as universities and large corporations. A Class A network can have up to 1,677,214 nodes. A Class C network can have up to 254 nodes.

|  |  |  |
| --- | --- | --- |
| **Classes** | **Decimals start with…** | **Binary starts with…** |
| Class A | 1 – 126 | 0xxx |
| Class B | 128 – 191 | 10xx |
| Class C | 192 – 223 | 110x |
| Class D  (for multicast) | 224 – 239 | 1110 |
| Class E  (for experimental purposes) | 240 – 254 | 1111 |

**Addresses Beginning with 127: Local Testing**

If you look carefully at the second column, you can see that numbers beginning with 127 are left out! This isn’t an oversight—it’s because all addresses beginning with 127 (or in binary, 01111111) are reserved for connecting back to and testing the local machine.

Useful command: You can test your network connection by pinging your own computer! Just type ping 127.0.0.1 at the command line.

Subnet and Subnet Masks

Each IP address has an associated subnet mask. Applying a subnet mask to an IP address allows you to identify the network and node parts of the address. Subnet masks begin with 255. You might think of a subnet mask like a ZIP or area code for the computer: it tells the network what general department or area the computer is in. These addresses are called “masks” because each computer is assigned another address behind the subnet—like a street address.

Each class of address has a default subnet mask. For example, for a Class A address, the default subnet mask is 255.0.0.0. This means that the first 8 bits represent the network part and the last 24 bits represent the node part. In other words, a Class A network can have up to 224 (16,777,216) nodes or computers. (Typically, the first and last addresses are for broadcast and are not usable. So the actual number of usable addresses is 16,777,216 – 2 = 16,777,214).

Default subnet masks:

* **Class A** - 255.0.0.0 - 11111111.00000000.00000000.00000000
* **Class B** - 255.255.0.0 - 11111111.11111111.00000000.00000000
* **Class C** - 255.255.255.0 - 11111111.11111111.11111111.00000000

Subnetting allows you to create multiple logical networks that exist within a single Class A, B, or C network. If you do not subnet, you are only able to use one network from your Class A, B, or C network, which is unrealistic. For example, your ISP may assign you a block of Class C addresses such as 200.1.2.*x* (where *x* can be 1–254), with the default subnet mask of 255.255.255.0. With subnetting, you can split the network into two logical subnets. The first subnet is 200.1.2.*y* (where *y* = 1–127), and the subnet mask is the default of 255.255.255.0. The second subnet is 200.1.2.*z* (where *z* = 129–254), and the subnet mask is changed to 255.255.255.128.

How IP Addresses Are Assigned

Registered IP addresses on the Internet are generally assigned hierarchically. Users are assigned IP addresses by their Internet service providers (ISPs). ISPs obtain allocations of IP addresses from a local Internet registry (LIR) or National Internet Registry (NIR), or from their appropriate Regional Internet Registry (RIR). IANA (Internet Assigned Numbers Authority) is responsible for global coordination of the Internet Protocol addressing systems.

Only a limited number of registered IP addresses are available on the Internet. To avoid using up all the addresses on the Internet, a range of IP addresses are allocated for private use addressing internal networks. Routers on the Internet do not forward traffic using these private addresses. The most common use of these private addresses is in residential networks. Most ISPs allocate only a single routable IP address to each residential customer, but many homes have more than one networked device. In this case, private addresses are used for all home devices, and a firewall or router translates the private addresses to the public-facing routable IP address.

Student Resource 9.5

Minor Project Notes: Network Setup

Student Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date:\_\_\_\_\_\_\_\_\_\_\_

Directions: As you work through setting up your network, take notes in each section of this worksheet in preparation for writing your how-to guide. Remember to record all of the configurations you assign, such as IP addresses and workgroup or computer names.

Physically Connecting Computers:

Configuring IPs:

About My Network:

My Computer’s Name:

Computer Description:

Workgroup Name:

IP Address:

Subnet Mask:

Default Gateway:

Troubleshooting Tools:

File Sharing:

Student Resource 9.6

Peer Review: How-to Guide

Student Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date:\_\_\_\_\_\_\_\_\_\_\_

Directions: Read through the rough draft of your classmate’s how-to guide. Then fill out the worksheet below to give the writer feedback about the strengths and weaknesses of the draft and the areas that could be improved upon for the final version.

Feedback

Part 1 – Layout

1. What type of layout does the writer use to help the reader understand the process of setting up a network? (For example: lists, columns, visual diagrams or images, etc.)
2. Are these tools used in a manner that helps the reader understand the material?
3. How could the tools be used more effectively, to help the reader easily understand the process?

Part 2 – Content and Language

1. Does the guide provide enough detailed information so that even someone with minimal technical background could successfully perform the steps? What information is still unclear or missing?
2. Is the language clear and easy to follow? Why or why not?

Part 3 – Overall Assessment

Based on your above observations, do you think the draft effectively explains how to set up file sharing in a client computer on a peer-to-peer network? Why or why not?